



CHLORINE USE REDUCTION LAB REPORT





TEST REPORT

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Report Number: 2295-20498

Project Number: 34044

Report Issued: July 2, 2020

Report To: ASSE International

Tested For: KD Enterprises LLC
4348 Waialae Ave 315
Honolulu, HI 96816

Code/Standard: NSF/ANSI 50 - 2019

Product(s) Tested: The HDC Device

Test Date(s): June 5-June 23, 2020

Test Location: IAPMO 5001 East Philadelphia Ontario CA 91761

Conclusion: The device identified above COMPLIED with the standard for the reduction of chlorine use and hydrostatic pressure.

During the sample run there was a 41% reduction in chlorine use.

Report Status: IN COMPLIANCE

Reviewed By:

Sal Aridi - Director

This report replaces number 2295-20491, it was reissued to removed the results that the manufacturer did make a claim for.

All testing and sample preparation for this report was performed under the continuous, direct supervision of IAPMO R&T Lab, unless otherwise stated. The statement of compliance is based on the test results compared to the standard specifications without considering measurement uncertainty. The observations, test results and conclusions in this report apply only to the specific samples tested and are not indicative of the quality or performance of similar or identical products. Only the Client shown above is authorized to copy or distribute the report, and then only in its entirety. Any use of the IAPMO R&T Lab name for the sale or advertisement of the tested material, product or service must first be approved in writing by IAPMO R&T Lab.



TEST SPECIMENS

Two test specimens were sent by KD enterprise and received in good condition on April 29, 2020.

Standard Requirement:

For devices claiming a reduction in chlorine consumption, the mass of chlorine used during the test period shall be a minimum of 25% less than the mass of chlorine used during the baseline period.

For devices claiming a reduction in combined chlorine, the average combined chlorine in the test water measured during the test period shall be a minimum of 25% or 0.20 mg/L, whichever is greater, less than the average combined chlorine in the test water measured during the baseline period.

For devices claiming a reduction in acid consumption, the mass of HCl used during the test period shall be a minimum of 25% less than the mass of HCl used during the baseline period

For devices claiming head loss claim the actual head loss shall not exceed the claimed head loss by more than 5%

For devices claiming hydrostatic pressure test, the device shall show no evidence of rupture, leakage, burst, or permanent deformation when subject to a hydrostatic pressure 1.5 times the manufacturer's maximum operation pressure

Performance Validation Test Setup:

See Figure 8, a 10,000 gallon tank with the following dimensions was used. The tank was covered and air conditioned.

Height: 5'6"

Width 8'6"

Length 46'

A variable frequency pump was used to pull water from the tank at an elevation of 1' from the bottom and push water through an 18" sand filter that has a bed depth of 11". The water then went through a Coates water heater then through the device under test which was installed in a 2 inch sched 40 line parallel to a blank pipe and valved so that it can be isolated. The water then returns to the tank at an elevation of 1 ft below the water surface.

An inline turbidity meter and chlorine/ pH controller were installed to control the chlorine and acid feed pumps. A mixing pump was used to keep the water mixed.

After completion of the baseline run the test tank was drained rinsed refilled and rebalanced. The filter sand was replaced with fresh sand to a bed depth of 11 inches.

When the sand was fresh the filter was backwashed until clean at 38 gpm and rinsed for 30 seconds. When the filter was dirty it was backwashed until it was clean Turbidity < 10 then rinsed until clean.



Results:

The mass of chlorine used was measured during the baseline run as well as the sample run; the data is in Table 1.

Table 1- Mass of Chlorine Used in gm During Each of the 7 Day Runs

Chlorine 4%	
Baseline Run	Sample Run
34935	20605

During the Sample run the chlorine usage was 41% less.

Table 2- Operational Data

	Baseline Run	Sample Run
Average Total Chlorine ppm	1.94	2.08
Average Combined Chlorine ppm	0.15	0.13
Average Chlorine Use Per Day gm	4991	2944
Total Synthetic Bather Load Used gm	6150	6230
Average Water Temperature °F	83.8	81.1
Average Air Temperature °F	80.3	77.2
Average Flow Rate gpm	26.7	27.6
Conditioned Makeup Water Added gal	2987	2400*
Number of Filter Backwashes	1	1

**The amount of water going to drain through the turbidity monitor and chlorine controller was slowed to reduce wasted water.*

Figures 2- 6 show the logs of the data captured during the running of tests; this data was sampled from the return line just upstream of the filter. A couple of spikes of chlorine were due to sensor fouling. During the first 2 days of the baseline run the chlorine and acid ran out in the early morning hours.

Hydrostatic Test:

Rated Pressure: 50 psi
Test Pressure: 75 psi
Test Duration: 5 min
Test Water Temp: 78.9° F

Test Result: **PASS**

Head Loss Test:

Table 3- Pressure Drop Across Sample

Flow gpm	26.2	34.4	50.4	63.4	72.0
Pressure in	0.4	0.9	1.5	2.2	2.6 (differential)
Pressure out	0	0	0.3	0.4	
Pressure Drop psi	0.4	0.9	1.2	1.8	2.6

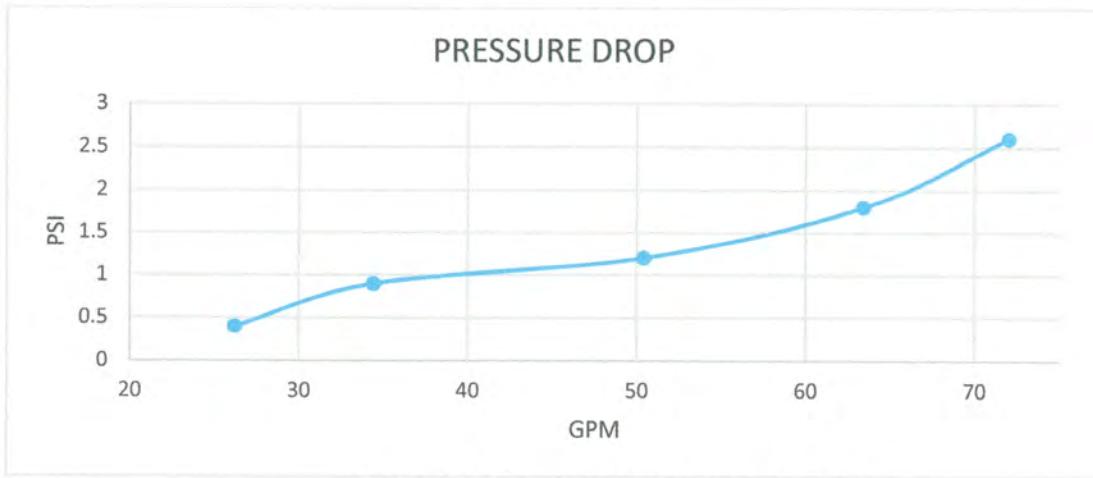


Figure 1-Pressure Drop Across Sample



Figure 2- pH and Free Available Chlorine During the Baseline Run

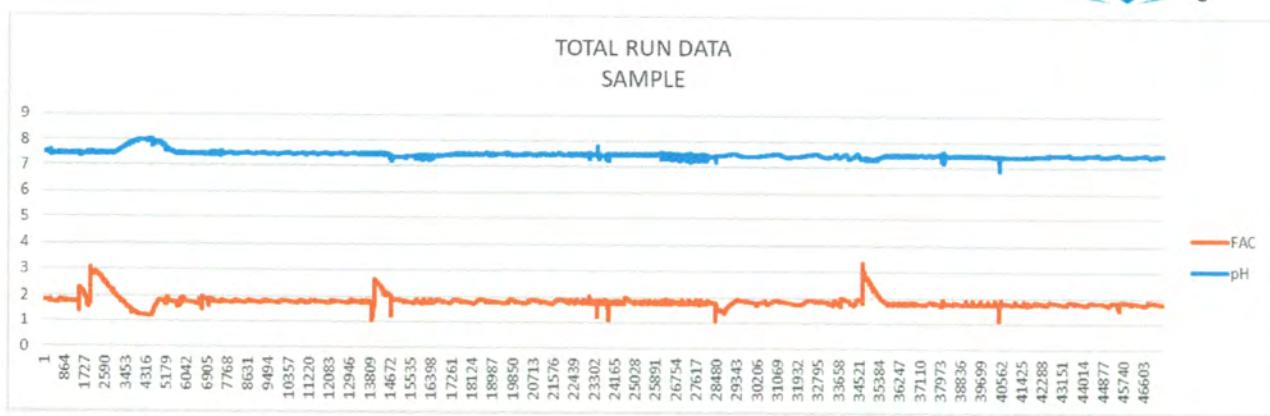


Figure 3- pH and Free Available Chlorine During the Sample Run

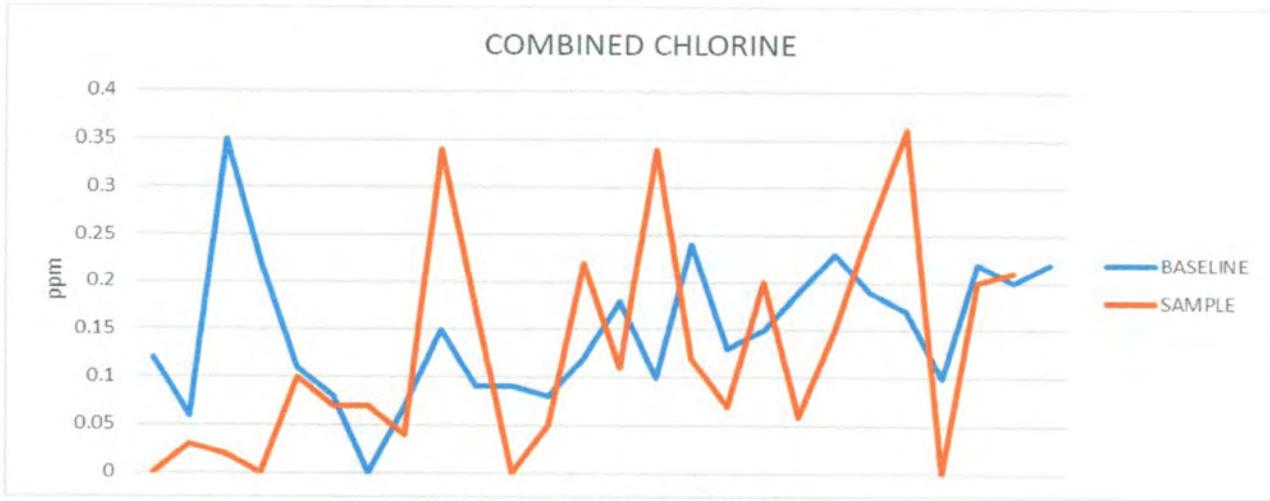


Figure 4- Combined Chlorine

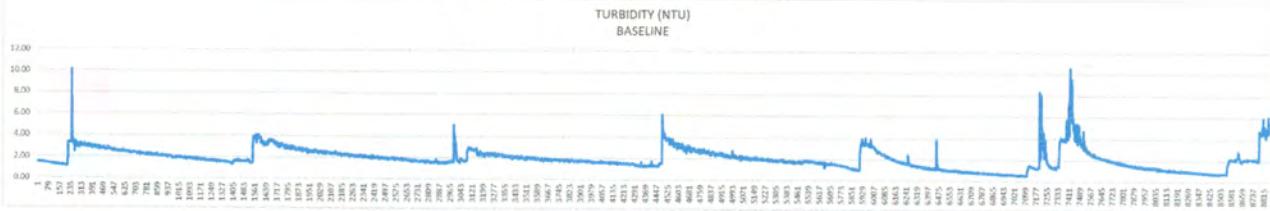


Figure 5- Turbidity During the Baseline Run

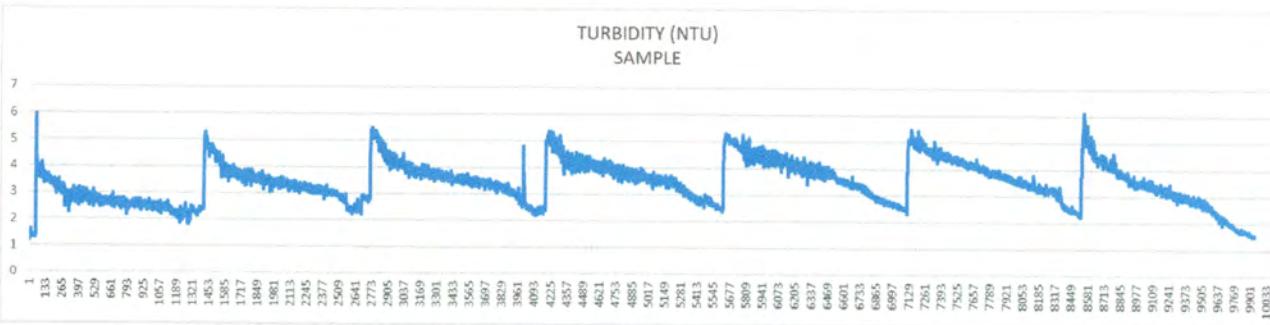


Figure 6- Turbidity During the Sample Run



Figure 7- Sample Under Test

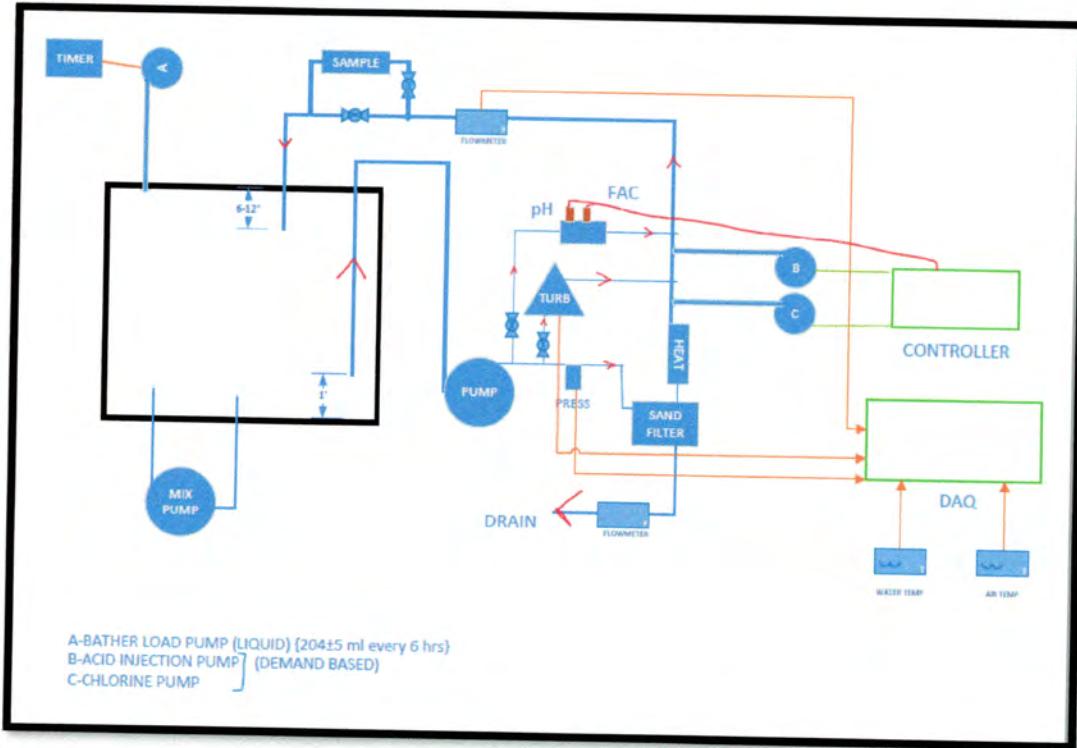


Figure 8- Test Setup